Plan of Study for

Sacramento River Diversion Project

Feasibility Study

November 2001

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U.S. Bureau of Reclamation

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CHAPTER 1. INTRODUCTION

OBJECTIVES AND ORGANIZATION OF THE PLAN OF STUDY

The purpose of the Plan of Study (POS) is to formulate the strategy and approach for the Sacramento River Diversion Project Feasibility Study (Study). The proposed Sacramento River Diversion Project (Project) has a long history of development through several regional collaborative efforts, and it would continue to affect and be affected by ongoing activities on both regional and local scales. The proposed Project reflects the current concept of regional and local collaborations.

Chapter 1 of the POS provides the reference to the Public Law (PL) 106-554 that authorizes the Study. Chapter 2 provides summaries of project background, details of Project components, and project relationships to other programs/projects. The proposed Project has a long history in development, and it can be related to previous and ongoing efforts in the Lower American River basin and other statewide projects and programs. The relationships are summarized in Chapter 2 and detailed in *Appendix A: Programs and Projects Related to the Sacramento River Diversion Project*. Chapter 3 provides the tasks that would be required to complete the feasibility study, environmental review and documentation, and public involvement program for the Study. A plan for the development of public outreach efforts is provided in *Appendix B: Public Involvement Program Plan for the Sacramento River Diversion Project*.

STUDY AUTHORIZATION

PL 106-554 Appendix D Sec. 103 authorizes the Secretary of the Interior to conduct a feasibility study for a Sacramento River, California, diversion project that is consistent with the Water Forum Agreement dated April 24, 2000, and that considers: [1]

- Consolidation of several diversions of Natomas Mutual Water Company (Natomas) and upgrading fish screens at the consolidated diversion.
- The diversion of 35,000 acre-feet per year (AF/year) of water by the Placer County Water Agency (PCWA).
- The diversion of 29,000 AF/year of water for delivery to the Northridge Water District (Northridge).
- The potential to accommodate other diversions of water from the Sacramento River, subject to additional negotiations and agreement among Water Forum signatories and potentially affected parties upstream on the Sacramento River.
- An intertie between the Elkhorn Diversion and the Northridge pipeline that delivers water from the American River.

The Study will evaluate the feasibility of a Sacramento River Diversion described in the PL 106-554 except for Natomas' diversion consolidation and fish screen upgrade, which is currently studied under

[1] The description of the authorized study components is from the PL 106-554. More detailed descriptions of project components and related stipulations in the Water Forum Agreement is provided in *Proposed Sacramento River Diversion Project* section in Chapter 2.

a separate effort. Requirements stipulated in the PL 106-554 for the authorized feasibility study include:

- The Study shall include the development of a range of reasonable options, an environmental evaluation, and consultation with federal and State resource management agencies regarding potential impacts and mitigation measures.

- Subject to the availability of appropriations, the Secretary of the Interior is also authorized and directed to provide grants to support local habitat management planning efforts undertaken as part of the consultation required in the feasibility study.

- The Study shall be performed in coordination with CALFED efforts.

- The reports that document the Study results will be submitted to the Committee on Resources of the United States House of Representatives and to the Committee on Energy and Natural Resources of the United States Senate within 24 months after the funding is appropriated.

PLANNING OBJECTIVES OF THE STUDY

Congress directed the Secretary of the Interior to conduct a feasibility study for a Sacramento River diversion project that was consistent with the Sacramento Area Water Forum Agreement. The coequal objectives of the Water Forum were: (1) provide a reliable and safe water supply for the economic health and planned development of the lower American River basin through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.

Prior to the Water Forum, Reclamation and local agencies completed the American River Water Resources Investigation (ARWRI). The objectives of the ARWRI were to identify future water needs in Sacramento, Sutter, El Dorado, Placer and San Joaquin counties, and to formulate alternatives to meet those needs. Additional details of the ARWRI and the Water Forum are provided in Chapter 2.

This Study will be tiered off two previously completed programmatic studies: the ARWRI and the Water Forum Agreement. The planning objectives of this Study include:

- Provide adequate future water supply (year 2030 level) to western Placer and northern Sacramento counties to accommodate planned community growth.

- Reduce future direct diversions from the American River to preserve lower American River environmental and aesthetic values.

- Reduce overdraft of the groundwater basin underlying western Placer and northern Sacramento counties to increase the health of the groundwater basin.

- Increase water supply reliability for all beneficial uses of American River water and indirectly, increase water supply reliability for beneficial uses of the groundwater basin under western Placer and northern Sacramento counties.

These planning objectives are consistent to the objectives of the Water Forum and the ARWRI; however, the Study will include a more focused study area, scope and analyses of project-level details. These planning objectives would be revised and refined during the Study period.

CHAPTER 2. SACRAMENTO RIVER DIVERSION PROJECT

PROJECT BACKGROUND

Sacramento River System

The Sacramento River (see Figure 2-1), which is controlled by Shasta Dam, is the largest river system in California. Major tributaries to the Sacramento River include the American and Feather rivers. These three rivers provide many recreational, agricultural, and environmental resources within Sutter, Placer, and Sacramento counties.

Flow Conditions

After Shasta Dam was built in 1943, the annual average of Sacramento River flow at Verona has been about 14.3 million AF/year, of which 44 percent is from the Feather River watershed. The Sacramento River provides the major water source for the Central Valley Project (CVP) with major storages within the upper basin including Shasta Lake (4.6 million AF), Whiskeytown Lake (241,000 AF) and Black Butte Lake (143,700 AF).

The Feather River, with a drainage area of 5,921 square miles, is the largest tributary of the Sacramento River below Shasta Dam. The Feather River flows into the Sacramento River near Verona. Since the construction of Lake Oroville in 1967, the Feather River has contributed on average 6.4 million AF/year to the Sacramento River. Two major tributaries of the Feather River are the Yuba River and the Bear River, contributing about 30 percent of the Feather River flow on average.

The largest storage facility in the Feather River watershed is Lake Oroville on the Feather River with a capacity of 3.5 million AF. The reservoir is owned and operated by the State Water Project (SWP). Other major reservoirs include New Bullards Bar Reservoir on the Yuba River (961,000 AF, owned and operated by Yuba County Water Agency), and Lake Almanor (1,175,000 AF, owned and operated by Pacific Gas and Electric (PG&E)). Through PG&E's Drum-Spaulding Project, PCWA receives water diverted from the Yuba River and the Bear River. The U.S. Bureau of Reclamation (Reclamation) does not own or operate any major water supply facilities in the Feather River watershed.

The American River is another major tributary to the Sacramento River. The American River basin covers about 1,936 square miles and ranges in elevation from 23 feet to more than 10,000 feet. The average annual flow of the American River at Fair Oaks has been approximately 2.77 million AF/year since the Folsom Dam was constructed in 1956. It contributes about 15 percent of the total Sacramento River flow below the confluence at Sacramento. The largest reservoir in the basin, Folsom Lake (974,000 AF), is owned and operated by Reclamation for the CVP. Other major reservoirs include the Union Valley Reservoir on Silver Creek (270,000 AF, owned and operated by Sacramento Municipal Utilities District (SMUD)), and PCWA's Hell Hole Reservoir on the Rubicon River (207,600 AF) and French Meadows Reservoir on the Middle Fork of the American River (136,400 AF).

Below the confluence with the American River at Sacramento, the Sacramento River continues to flow down to the Sacramento-San Joaquin Delta (Delta), where it merges with the San Joaquin River, and then through the San Francisco Bay to the Pacific Ocean. Delta inflows from the Sacramento River, partially augmented by the operations of CVP and SWP, are about 62 percent of the total inflow. Both

Figure 2-1.

the CVP and SWP export water to the San Joaquin Valley and southern California through the pumping facilities in the south Delta.

Water Quality

Surface water quality is a function of the mass balance of water quality from tributary streams, diversions, agricultural return flows, subsurface drainage flows, permitted discharges from M&I sources, and urban runoff. In general, the quality of water in the American River is high from the river's headwaters to its confluence with the Sacramento River. However, Feather River water quality generally degrades as the water moves downstream from Lake Oroville to its confluence with the Sacramento River. Conditions generally degrade downstream as a result of agricultural drainage, particularly from the Sutter Bypass.

The Sacramento River, below Shasta Lake to its confluence with the American River, experiences variable water quality conditions largely influenced by flow conditions, temperature, agricultural runoff, and mine drainage from the Iron Mountain area. From the confluence with the American River to the Delta, water quality varies due to urban runoff, the amount of flow from the American River, and agricultural runoff.

Fisheries

More than 30 species of fishes are known to use the Central Valley portion of the Sacramento River, which extends from Keswick Dam to the Delta. The upper section of the Sacramento River, from Keswick Dam to Princeton, corresponds to the portion of the river in which salmon spawning occurs. The upper section and its tributaries provide critically important spawning and rearing habitat for a number of special status anadromous fish species, including all four runs of Sacramento River Chinook salmon, steelhead trout and green sturgeon.

The lower portion of the Sacramento River extends from Princeton to the Delta, and includes the confluences of both the Feather and American Rivers. The Lower Sacramento River is largely channelized and leveed, and is bordered by agricultural lands. This section of the river provides no spawning habitat for salmonids, but it serves as a migratory corridor for the fish that spawn in the upper Sacramento River and tributaries, and for anadromous fish that spawn in the Feather River and American River basins. Striped bass and American shad, two nonnative anadromous species, spawn in the lower Sacramento River. Other special status species that occur in the Sacramento River include Sacramento splittail, Delta smelt and hardhead.

The Lower American River below Nimbus Dam is utilized by over 30 species of fish, including numerous resident native and introduced species, and several anadromous species such as fall-run Chinook salmon, steelhead, striped bass and American shad. This stretch of the river extends 23 miles. The Lower American River provides several types of aquatic habitat including shallow, fast-water riffles, glides, runs, pools, and off channel backwater habitats. Fall-run Chinook salmon and steelhead within the Lower American River are partially limited by inadequate instream flow conditions and excessively high water temperatures during portions of their freshwater residency in the river. High water temperatures during the fall can delay the onset of spawning by fall-run Chinook salmon and steelhead, whereas high temperatures during spring and summer would adversely affect rearing juvenile salmon and steelhead.

Folsom Reservoir and Lake Natoma on the American River are inhabited by a great diversity of species, most of which were introduced. Folsom Reservoir is strongly stratified from April to November, so its surface waters are warm and the deeper layers are cold. As a result, the reservoir

supports both warm-water and cold-water fisheries. Cold-water releases from the deep-water layers of Folsom Reservoir maintain cold-water fisheries in Lake Natoma and the Lower American River. Management of the cold-water pool of the reservoir is critically important for maintaining adequate water temperature conditions in the river for migrating fall-run Chinook salmon during late summer and early fall.

The Feather River and its tributaries are spawning grounds for several special status anadromous species including fall-run and spring-run Chinook salmon, steelhead trout and green sturgeon. Striped bass and American shad, which are nonnative anadromous species, also spawn in the Feather River. Salmon and shad also spawn in the Yuba River, a major tributary of the Feather.

The Delta and San Francisco Bay together comprise the largest estuary on the West Coast. Over 120 fish species inhabit this estuary during at least a portion of their life cycle. The Delta species include many anadromous species, as well as freshwater, brackish water and saltwater species. Special status species of the Delta include all four Chinook salmon runs, steelhead trout, sturgeon, Delta smelt, Sacramento splittail, and longfin smelt. The Delta is a primary habitat for striped bass, Sacramento splittail, sturgeon Delta smelt, and longfin smelt.

Vegetation and Wildlife

The vegetation of the Sacramento River system supports a diversity of terrestrial wildlife species and reflects the Great Valley and Sierra Nevada foothill bioregions of California. Plant community composition within these regions includes riparian, grassland, oak woodland, chaparral, conifer forest and emergent wetland vegetation types. These terrestrial habitats provide seasonal and year round habitat for many species of native and introduced wildlife. The following description provides an overview of the vegetation and wildlife associated with the Sacramento River, and two major tributaries, the American and Feather Rivers, and the Natomas Cross Channel.

The Sacramento River supports some riparian vegetation; however, it is limited to narrow bands between the river and the riverside of the levee. The riparian vegetation on the Sacramento River is not as diverse as on the American River. The Sacramento River riparian community consists of valley oak, cottonwood, wild grape, box elder, elderberry, and willow. The shores of the Lower Sacramento River are characterized by agricultural use.

Vegetation in the Feather River watershed is diverse, ranging from mixed conifer and deciduous forest to sparse ponderosa pine plant communities. Long-term vegetation disturbance and consequent gully erosion have led to dramatic changes in hydrology of the Feather River and its tributaries, resulting in reduced summer flow, higher summer water temperature, lower water tables, reduced meadow storage capacity, and a trend from perennial to intermittent flow. Many down cut streams no longer sustain late-season flow, causing adverse consequences to riparian and upland vegetation, aquatic communities, and downstream water users.

The Natomas Cross Channel joins the Sacramento River downstream from the mouth of the Feather River and upstream from the American River. This channel supports a dense riparian association of black willow, shining willow, and cottonwood. Riparian cover within the channel provides nesting, thermal, and escape covers for local wildlife populations within the American Basin. The channel also serves as a wildlife movement corridor for wildlife accessing the Sacramento River.

Numerous species existing throughout Sacramento County are State or federally listed as threatened or endangered or are candidates for listing under the Federal Endangered Species Act (ESA). Sensitive plant species potentially occurring in the area include Northern California black walnut and Sanford's

arrowhead. Sensitive wildlife species include Swainson's hawk, valley elderberry longhorn beetle, bank swallow, and giant garter snake. In addition, Sacramento County contains numerous vernal pools, some of which may be inhabited by the federally listed vernal pool tadpole shrimp and the vernal pool fairy shrimp.

Throughout these regions native species have declined due to the introduction of invasive non-native species of plant and wildlife. Native riparian vegetation has been replaced with introductions of tamarix, giant reed, and tree-of-heaven. Populations of non-native species including red fox, bullfrog, and brown-headed cowbird have reduced native wildlife populations.

Land Use/Recreation

Sacramento County includes extensive areas of both urban and agricultural uses. The Sacramento metropolitan area (north of the American River, encompassing both the City of Sacramento and the outlying areas), is one of the fastest growing urban regions in California. The County's 1990 population is nearly four times that of the 1950 population and 97% of the population in the Project study area is considered urban. The City of Sacramento's statewide role, the presence of excellent recreation facilities, and the availability of land have contributed to this growth and are likely to continue to be magnets for future urbanization. The southern and southeastern portions of Sacramento County are dominated by a variety of agricultural uses, including croplands, along with rural residential land use.

Placer County has experienced significant growth as well since 1950. The southern portion of the County has become increasingly urbanized with the influx of industry and new residential development into the Roseville-Rocklin area in the 1980s. Roseville, the largest city in this part of the County, grew five-fold in the 40-year period. Continuation of urban growth in the County is accounted for in local General Plans.

Sutter County, which has also experienced consistent growth, has not grown as fast as Sacramento and Placer Counties. The southwestern corner of Sutter County is dominated by agricultural use, mainly field and tree crops, and in particular rice. The area is sparsely populated (20 to 80-acre parcel minimums) and has no incorporated or urban areas. A high proportion of residents in this region commute to locations outside of Sutter County for work.

The Lower American River, Folsom Lake, Lake Natoma, Sacramento River, and Feather River provide extensive water-related recreation opportunities to the Sacramento, Placer, and Sutter counties. The primary recreation facility on the Lower American River is the American River Parkway, which consists of 14 interconnected parks and a continuous trail system, comprising approximately 5,000 acres. Major activities include rafting, boating, fishing, and swimming.

Lake Natoma is a popular recreation destination with trail use, bank and boat fishing, small boat sailing, rowing and swimming. Folsom Lake is the most popular multi-use year round unit of the State parks system. Water levels and water level fluctuations would have a substantial influence on the availability and quality of recreation opportunities on both lakes.

There are many recreation opportunities on the Sacramento River from its confluence with the Feather River downstream to Courtland, including boating, fishing, canoeing, rafting, swimming, and picnicking. Fishing is one of the biggest uses of the Sacramento River. Stone Lakes National Wildlife Refuge is located within this southern portion of Sacramento County, east of the Sacramento River.

The Feather River supports extensive water-related recreation activities at Feather River Canyon, upstream and northeast from the River's confluence with the Sacramento River. There are several marinas, boat ramps, and river parks near the confluence of the Feather and Sacramento Rivers.

Aesthetics

The Lower American River has been designated a "Recreational River" in the National and State Wild and Scenic Rivers systems and is considered to exhibit high scenic quality. The visual characteristics of the Lower American River consist of steep bluffs, terraces, islands, backwater areas, and riparian vegetation. The Lower American River is divided into three visual components. The upper river visual component extends from Nimbus Dam downstream to the Gristmill Dam Recreation area and consists of steep bluffs, terraces, riparian vegetation and shallow water areas and is considered the most visually sensitive area along the river. The middle visual component is not considered as diverse as the upper river and consists of moderately sloped embankments, riparian vegetation, and shallow water areas. The lower visual component is considered the least visually sensitive and is primarily gravel banks, riffles, and ponds.

The Sacramento River segment with the richest visual variety extends from Keswick Reservoir downstream to Red Bluff. The segment below that, extending from Red Bluff to the confluence with the Lower American River, is largely confined by levees and rock revetment bank protection. The latter segment has less visual variety and is considered less pristine in appearance than the upper section of the river. The Lower Sacramento River, extending from its confluence with the Lower American River downstream to the Delta, is not considered visually sensitive as it is now leveed and bordered by agricultural land.

The Feather River segment near the confluence with the Sacramento River is located in an agricultural area in Sutter County. The terrain is generally flat, with little variation. The river channel is wide and contains murky, slow-moving water. The river is visible from the Garden Highway, which is not heavily used, and views of the River are limited because of the surrounding flat topography. This is also not a designated recreation area. Therefore this area is considered to be of low visual sensitivity.

Cultural Resources

Cultural resources include physical resources and intangible cultural values pertaining to paleontology, prehistoric and historic archaeology, history, and Native American ethnography. Paleontological resources include fossil animals and plants of scientific value. Archaeological resources include evidence of past human activities, both prehistoric and historic. Historic resources also include extant structures. Ethnographic resources may include natural or cultural resources, landscapes, or natural environmental features which are linked by a community or group of communities to the traditional practices, values, beliefs, history and/or ethnic identity of that community or wider social group.

Several dozen prehistoric sites have been identified along the Lower American River, North Fork American River, and Lower Sacramento River. These include village sites, bedrock milling stations, lithic scatters, and small campsites. More than a hundred prehistoric sites have been identified within the Folsom Reservoir basin. Of particular concern are sites located within reservoir inundation areas. Such sites are subject to degradation due to reservoir siltation, erosion from fluctuating surface water elevations, and vandalism when exposed by low surface water elevations.

Historic sites along the Lower American River, North Fork American River, and Lower Sacramento River include placer mining districts, railroad-related structures, irrigation and hydroelectric facilities, and historic residential structures. Ethnographic resources include historic Nisenan (southern Maidu)

village sites located along the Lower Sacramento, Lower American, and North Fork American rivers. Many archaeological sites in the area contain burials, and human remains are of substantial concern to contemporary American Indian people. Several federally recognized Tribes are located within the Project area. These include the United Auburn Indian Community of the Auburn Rancheria in Placer County and the Shingle Springs Band of Miwok Indians in El Dorado County. There are no federally recognized Tribes in Sacramento or Sutter counties. However, the State of California recognizes several other local groups of Native Americans.

Soils and Geology

Valley land soils are alluvial in nature and are found in deep alluvial fans and floodplains. These soils are highly valued for irrigated crops. Soils found along the edges of the Central Valley include brown neutral and red iron pan soils. Soils within Sacramento County have been significantly influenced by human activities for uses such as cultivation and urban development. Historically, gold dredging, hydraulic mining, drainage system development, creation of levees, and cut and fill have all contributed to modifying the original soils. Geologic formations underlying the foothills portion of the plan area consist of complex folded and faulted, metamorphosed volcanic and sedimentary rocks. The geology has been eroded to a landscape of moderate relief and thin soils.

Previous Regional Program-Level Studies

Two program-level analyses have been conducted in relationship to the proposed Project: the *American River Water Resources Investigation* (ARWRI) and the *Sacramento Area Water Forum* (Water Forum). A program-level analysis is usually conducted to develop a comprehensive plan designed to resolve a complex suite of problems that cannot be resolved by individual projects alone. An analysis is conducted in just enough detail to (1) allow decision makers to determine and compare the reasonableness or feasibility of each alternative set of projects under consideration in the programmatic document, and (2) ensure all significant and adverse regional impacts are defined and mitigated.

Project-specific investigations, such as this Study, tier to the previous program-level studies. Tiering is the process of building on program-level documents. More detailed, narrower, and project-level/project-specific impact and mitigation assessments will be performed for a project that is part of the preferred program in the programmatic Environmental Impact Statement (EIS) or Environmental Impact Report (EIR). The project-specific investigation does not need to re-evaluate issues and alternatives that have been resolved, mitigated, or excluded from further actions in the programmatic documents. For example, this Study need not re-evaluate a large surface storage project to supply increased surface water demands because this solution was evaluated in the ARWRI and considered less favorable.

American River Water Resources Investigation

Overview

Reclamation completed the ARWRI in 1997 with the preparation of the Final Planning Report and Final EIS. The objectives of the ARWRI included meeting projected year 2030 water demands in five counties (El Dorado, Placer, Sacramento, San Joaquin, and Sutter) and stabilizing the groundwater basins.

Three alternatives were analyzed in the ARWRI EIS: No-Action Alternative, Auburn Dam Alternative, and Conjunctive Use Alternative. Both the Auburn Dam Alternative and Conjunctive Use

Alternative include components that could be implemented by local water purveyors including wastewater reclamation, conservation, new and/or expanded surface water diversions, and new surface water storage. The principal difference between these alternatives is the method of developing new yield. The Conjunctive Use Alternative has a large conjunctive use component; the Auburn Dam component is the main source of additional water supply in the Auburn Dam Alternative.

A number of components are included in both alternatives. These components are referred to as "Common Elements" that include an annual Feather River diversion of up to 74,000 AF/year to serve M&I demand in western Placer County. This diversion will supply 20,000 AF/year to the City of Roseville (Roseville), 29,000 AF/year to the Northridge, and 25,000 AF/year to other PCWA service areas. The diverted water will represent an exchange of PCWA's Middle Fork Project (MFP) water on the American River for the delivery from the State Water Project (SWP).

Conjunctive Use Alternative

The Conjunctive Use Alternative was identified as the environmentally superior alternative in protecting the Nation's environment. This designation is based on the potential impacts associated with the Auburn Dam component being determined as significantly greater than the large conjunctive use diversions under the Conjunctive Use Alternative during high flow events. However, Reclamation did not identify a federal role for meeting the future water demands within the ARWRI study area. Therefore, a preferred federal program was not identified. Reclamation's position for implementing Common Elements is described in the ARWRI EIS as follows:

> *"The Common Elements are being considered by the local agencies as a first step towards meeting their long-term needs. Reclamation embraces the local support for the Common Elements, with future component selection to be conducted by the local agencies. Implementation of the Common Elements would require cooperation between purveyors in the regional water community. Although Reclamation is a part of the regional water community, Reclamation will take no action on an individual component, or group of components, without a local sponsor request for Reclamation participation. Reclamation could then provide technical assistance or undertake a specific Federal action. If a local sponsor requests Reclamation participation then Reclamation would first ensure that it has authority from Congress to undertake the action (i.e., a Federal role is defined, authorization exists, and the activity is funded). A determination would also be made whether the action was feasible from the national standpoint. A feasibility determination would typically include conducting project specific environmental analysis, and a NED[2] or similar economic analysis, pursuant to appropriate federal statutes or new authorization."*

Sacramento Area Water Forum Agreement

The Sacramento Area Water Forum (Water Forum) was formed in 1993 by a diverse group of water managers, business and agricultural leaders, environmentalists, citizen groups, and local governments in Sacramento, Placer, Sutter, and El Dorado counties. The coequal objectives of the Water Forum are: (1) to provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) to preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. In January 2000, the stakeholders of the Water Forum adopted the Water Forum Agreement. The Water Forum Agreement describes a conjunctive use

[2] National Economic Development. The benefit evaluation procedures are specified in *Economic and Environmental Guidelines for Water and Related Land Resources Implementation Studies* (1983).

program to meet the region's water demands and provide environmental benefits to the Lower American River.

The Water Forum Agreement includes several new and expanded diversions that are relevant to the proposed Project. On the American River, these include PCWA's diversion increase of 27,000 AF/year with dry-year replacement water, Northridge's diversion of 29,000 AF/year in wet and average years, and Roseville's diversion increase of 35,100 AF/year with dry-year reduction and replacement water. On the Sacramento River, these include an increased diversion for the City of Sacramento[3] and PCWA's diversion of 35,000 AF/year. There is no Water Forum limitation associated with these two diversions.

A programmatic EIR for the Water Forum Agreement was completed in October 1999. The EIR indicated the Water Forum Plan (WFP) was the environmentally preferred alternative with significant and potentially significant impacts to the Lower American River and Folsom Lake including effects to certain fisheries, recreational opportunities, and cultural resources. Potential mitigation measures were identified as a part of the Habitat Mitigation Element of the Water Forum Agreement. The EIR also identified the potential impacts to the Delta due to the increased surface water diversions by year 2030; however, the area of origin statue would provide the necessary priority for the local beneficial uses of the American River water.

Among seven alternatives to the WFP evaluated in the EIR, Alternative 1 is the most similar to the proposed Project. In Alternative 1, up to 78,000 AF/year of surface water diversions are moved from the Lower American River to the Sacramento River to reduce impacts on the American River. These diversions are to be made at a new Elkhorn diversion facility for Northridge (29,000 AF/year) and a new diversion on the Sacramento River at Freeport for South County Agricultural Water Users (35,000 AF/year) and the City of Folsom (14,000 AF/year). The EIR reported that Alternative 1 would have impacts similar to those of the WFP, but slightly reduced impacts to fisheries in Folsom Lake and the Lower American River.

Many elements in the Water Forum Agreement are related to the proposed Project. These elements are discussed in Appendix A and the following sections.

Challenges in the Lower American River Basin

Several challenges related to the effects of urbanization face the water purveyors in the Lower American River basin. In the future, they must contend with:

- Increasing municipal and industrial (M&I) demand
- Balancing environmental and social concerns
- Providing groundwater stabilization
- Improving system reliability

Increasing Municipal and Industrial Demand

One challenge facing the water purveyors in the Lower American River basin is maintaining their ability to meet the water supply needs of a growing urban population. Projections of urbanization and the associated water demands were analyzed in the ARWRI Planning Report (Reclamation, 1997).

[3] The modeling efforts that supported the Water Forum Agreement assumed the City of Sacramento diverting 290 cfs from the Sacramento River and the volumetric increase of 85,600 AF/year from the American and Sacramento Rivers.

The ARWRI analysis utilized DWR population and water demand projections. These projections made use of State Department of Finance population information and an assumed growth rate to estimate population growth in the investigation area between the 1990 base year and 2030. Within this period, a 122 percent population increase was projected. This translated into a 2030 estimated population of 2,462,000 in Sacramento and Placer counties.

Water demand projections were developed using the future population projections. DWR assumed that per capita urban water use would be reduced by approximately 10 percent as compared to 1990 use. This estimate was based on assumed implementation of specific best management practices (BMPs). From this information, urban water demands in Sacramento and Placer counties were expected to increase from 436,000 AF/year (1990 base year) to 815,000 AF/year (year 2030).

The ARWRI also included a Needs Assessment. This assessment concluded that demands within the study area would exceed supplies and that new sources of water supply and/or demand reduction would be needed before year 2030.

Balancing Environmental and Social Concerns

As discussed in the ARWRI Needs Assessment, new sources of water supply will be needed to meet growing water demands. However, the environment could be adversely affected by increased surface water diversions. Minimizing such environmental concerns presents another challenge facing the water purveyors in the Lower American River basin.

The Water Forum Agreement recognized the potential impacts of the seasonal diversion increases required to meet future demands. These impacts could involve fisheries, wildlife, recreation, and or aesthetics. As a result, it identified the need to augment Lower American River flows for fishery reasons, especially in dry years, as part of their approach to achieve their coequal objectives to provide adequate water supply and protect the environment.

Both the ARWRI and Water Forum recognized that the potential benefits of moving diversions on the American River, especially upstream or at Folsom Dam, to another diversion location off a waterway other than the American River. The alternative diversion location would increase water management flexibility, reduce diversions from the American River, and provide additional operational flexibility to operate Folsom Lake for downstream fishery, water quality, water temperature, recreational and aesthetic benefits.

Providing Groundwater Stabilization

Another challenge facing the water purveyors in the Lower American River basin is stabilizing the groundwater basin to allow for its continued use. Without increased surface water deliveries in the future, the majority of water demands in the area would be met by increased groundwater pumping. However, this action would result in a basin extraction rate in excess of recharge capacity.

Both the ARWRI and Water Forum Agreement recognized the necessity of groundwater stabilization. The purpose of groundwater stabilization was to maintain access to a safe and reliable supply of water. The ARWRI analysis assumed the groundwater basin would be stabilized at the 1990 levels. The Water Forum refined the groundwater sustainable yield analysis of ARWRI for the Lower American River area and concluded that a greater yield could be sustained at lower levels and result in less surface diversions required to meet the projected demand in this region. Thus, the Water Forum Agreement adapted the groundwater sustainable yield recommendations based on 1990 pumping amounts. This yield would stabilize the groundwater basin at elevations below the 1990 levels

(declines ranging from 21 to 51 feet). To assist in regional groundwater management, the Water Forum Agreement included the basic provisions for a groundwater management governance structure, Sacramento North Area Groundwater Management Authority.[4]

Improving System Reliability

The water purveyors in the Lower American River basin are also facing the challenge of improving their system reliability. The risk associated with interrupted or insufficient M&I water supply becomes significant as the population and demands increase and the distribution systems expand over time.

The interruption or insufficiency of water supply may be caused by dry-year reductions in surface water deliveries and accidental pollution in water source or other incidents that prevent the water purveyors from diverting water. The potential for dry-year reductions in surface water deliveries for local water purveyors would also increase for two reasons: 1) implementation of the surface water-groundwater balances included in the Water Forum purveyor-specific agreements and 2) the increasing water demands outside the Lower American River basin (such as water quality or flow objectives in the Delta).

To improve system reliability, the water purveyors would have to develop conservation programs to reduce the demands in dry years, and to develop alternative sources of water such as groundwater and diversions on other rivers as a backup. These alternative sources of water and water supply systems would provide additional redundancy in the water supply system to reduce the risk of interrupted or insufficient M&I water supply.

PROPOSED SACRAMENTO RIVER DIVERSION PROJECT

The proposed Project conforms to the PL 106-554 description of a new diversion on the Sacramento River. The one exception is the exclusion of the actions necessary to consolidate and screen the five diversions owned and operated by Natomas because studies for the diversion consolidation and screening were already funded and underway at the time of this authorization. The proposed Project location and components are shown in Figures 2-1 and 2-2, respectively, and the proposed Project components include:

- The diversion of 35,000 AF/year by PCWA under a CVP water service contract.
- The diversion of 29,000 AF/year of water for delivery to Northridge with CVP water, handled most likely as an exchange for PCWA MFP water on the American River.
- The diversion of 7,000 AF/year of water to Roseville with CVP water, handled most likely as an exchange for PCWA MFP water on the American River.
- The diversion of up to 100 million gallons per day (mgd) for the delivery to the City of Sacramento.
- Treatment and storage facilities with a capacity of 228 mgd for diversions for PCWA, Northridge, Roseville and the City of Sacramento.

[4] Now known as Sacramento Groundwater Authority.

- Pipeline systems to deliver treated water to and interconnect between the existing distribution facilities of PCWA, Northridge, Roseville and the City of Sacramento.

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- Figure 2-2.

Details of the Proposed Project

All project sponsors have diversions on the American River through water rights, CVP entitlements, and/or inter-agency water sale contracts. From a regional point of view, the proposed Project would provide the local sponsors with the diversions to satisfy their future needs and provide an opportunity to enhance the fishery and ecosystem in and along the Lower American River, of which water quality and habitat opportunities are significantly better than those of the Sacramento River.

Each component in the proposed Project has its unique purposes and needs that are discussed below. The discussion references other projects and programs, of which detailed descriptions are provided in Appendix A.

Proposed Diversion Location: Elkhorn

The proposed Project would divert water from the Sacramento River at the Elkhorn Diversion. The Elkhorn Diversion is currently owned and operated by Natomas. It and the Sankey Diversion are the two consolidated and screened diversions of Natomas included in the on-going *American River Basin Fish Screen and Habitat Improvement Plan* and as envisioned in PL 106-554 (see Appendix A).

An initial evaluation of diversion sites indicates that the Elkhorn Diversion may be superior to other sites because it would provide the best location to maximize the number of participating agencies and it would reduce both costs and potentially negative environmental impacts. The Elkhorn Diversion would conform to the concept of consolidating diversions on the Sacramento River as presented in PL 106-554. In addition, the Elkhorn Diversion site presents better site characteristics related to diversion designs than other locations closer to the City of Sacramento.

Proposed Diversion for Placer County Water Agency

The proposed Project would allow PCWA to divert their CVP entitlement at the Elkhorn Diversion instead of the currently point of diversion, the Folsom Dam.

PCWA holds about 120,000 AF of water rights on the American River above Folsom Lake and has a CVP entitlement for 35,000 AF/year of M&I water. PCWA anticipated that water needs in the fast-growing western Placer County would exceed the current planned capacity of 35,500 AF/year at the American River Pump Station near the Auburn Dam site, and another 35,000 AF/year of water supply would be needed. PCWA could expand the American River Pump Station to accommodate the additional 35,000 AF/year of diversion; however, it would be more cost-effective for PCWA to divert the additional 35,000 AF/year of water at Elkhorn Diversion by exercising their CVP contract entitlement for the use in western Placer County.

PCWA would divert their CVP entitlement at the proposed Project with an estimated maximum day (max-day) rate of diversion of 100 cfs. PCWA is a signatory of the Water Forum Agreement; however, the Water Forum Agreement does not address this portion of PCWA diversion in anticipation that the diversion would be made on the Sacramento River.

Proposed Diversion for Northridge Water District

The proposed Project would allow Northridge to divert up to 29,000 AF/year of water at the Elkhorn Diversion instead of the current authorized point of diversion, the Folsom Dam.

Northridge entered into an agreement with PCWA to receive up to 29,000 AF/year of water to implement a groundwater stabilization program. The water would be diverted through Reclamation facilities at Folsom Lake, treated at the San Juan Water District's Peterson Water Treatment Plant (WTP), and delivered to Northridge through the existing Cooperative Transmission Pipeline. The purpose of the groundwater stabilization program is to reduce Northridge's reliance on groundwater, alleviate the overdraft of the groundwater basin in the northern Sacramento County and southern Placer County, and provide long-term surface water-groundwater conjunctive use opportunities.

Northridge is a signatory of the Water Forum Agreement. The Water Forum Agreement stipulates that Northridge can only divert from Folsom Lake when the projected March to November unimpaired inflow of Folsom Lake is above 950,000 AF/year in the first ten-year period and the threshold would be raised to 1.6 million AF/year afterward. That is, after the ten-year period, Northridge could only divert their purchased surface water in approximate 50 percent of the years.

Northridge made the compromises in the Water Forum Agreement in anticipation that within the ten-year period, it would develop an alternative diversion point on the Sacramento River. This alternative diversion point would allow Northridge to divert the 29,000 AF/year through an exchange of CVP delivery when diversion threshold prevented diversions from Folsom Lake. The proposed Project would provide dry-year protection and system redundancy for Northridge's infill development. The diversion from the Sacramento River would offset their diversion from the American River. The estimated max-day diversion is 80 cfs.

Proposed Diversion for City of Roseville

The proposed Project would allow Roseville to divert up to 7,000 AF/year at the Elkhorn Diversion instead of the current authorized point of diversion, the Folsom Dam.

Roseville has a CVP entitlement with Reclamation to provide 32,000 AF/year of M&I water from Folsom Lake and a water purchase contract with PCWA for up to 30,000 AF/year of water. The water purchased from PCWA would be diverted through Reclamation's facilities at Folsom Lake, treated at Roseville's own treatment plant, and transmitted through the existing Roseville Pipeline.

Roseville is a signatory of the Water Forum Agreement. In the Water Forum Agreement, Roseville would use the 62,000 AF/year of entitlement for the projected 2030 water demand of 54,900 AF/year within its city limit and maintain an operational buffer, around 7,000 AF/year, for dry-year protection.

Currently, Reclamation would not consider the possibility of modifying the contract with Roseville to deliver a portion of their CVP entitlement at the Elkhorn Diversion. Therefore, Roseville would exercise their 7,000 AF/year of purchased entitlement with PCWA through the proposed Project. This would be done through an exchange with CVP delivery on the Sacramento River. The estimated max-day diversion is 15 cfs.

Proposed Diversion for City of Sacramento

The proposed Project would allow the City of Sacramento to divert up to 100 mgd at the Elkhorn Diversion instead of the current authorized point of diversion, the Fairbairn WTP.

The City of Sacramento is currently expanding the capacity of their Fairbairn WTP from 100 mgd to 200 mgd, and expanding the capacity of Sacramento River WTP from 100 mgd to 160 mgd. After the expansions, each WTPs would reach its maximum capacity.

The City of Sacramento is a signatory of the Water Forum Agreement. In response to the increasing environmental concerns in the Lower American River, the City of Sacramento agreed in the Water Forum Agreement to reduce the diversion at the Fairbairn WTP from 200 mgd to as low as 100 mgd in extremely dry years and in the October through December period when Hodge Flow criteria[5] apply. The expansion of the Sacramento River WTP, located downstream from the Fairbairn WTP, provides opportunity to shift the diversion downstream; however, it would not provide sufficient capacity to account for the 100-mgd reduction at the Fairbairn WTP.

At the proposed Project, max-day capacity for the City of Sacramento would be 100 mgd. The City of Sacramento intends to use the proposed Project to provide additional diversion and treatment capacity to account for the reduced capacity at the Fairbairn WTP. The City of Sacramento would divert the reduced amount at the Sacramento River WTP pursuant their water rights on the American River and reduce the same amount of diversion pursuant their Sacramento River water rights. The reduced diversion at the Sacramento River WTP pursuant to their Sacramento River water rights would be diverted at the proposed Elkhorn Diversion.

The proposed Project would also provide additional system redundancy for water supply to their infill development. Due to the northerly location of the Elkhorn Diversion, it would be more hydraulically efficient to serve the north Sacramento area from the proposed Project. In addition, a diversion location upstream from the confluence of the American River and the Sacramento River provides an opportunity for the City of Sacramento to divert water from the Sacramento River in situations when they cannot divert from the American River during emergencies such as a chemical spill in the Lower American River.

Currently, the City of Sacramento is negotiating with Natomas to share a portion of Natomas' diversion capacity.[6] Alternatively, the City of Sacramento could develop additional diversion capacity at the Elkhorn Diversion with PCWA, Roseville, and Northridge.

Proposed Surface Water Treatment Plant

The proposed Project includes a surface water treatment plant with a capacity of 228 mgd, located near the Elkhorn Diversion. The capacity of 228 mgd is the max-day capacity shared by PCWA (54 mgd), Roseville (9 mgd), Northridge (54 mgd) and the City of Sacramento (100 mgd).

Proposed Inter-tie Pipelines

Several pipelines would be needed to transfer the treated water to the service areas of local sponsors. The proposed pipelines include:

- A 84" intertie along Elverta Road to transfer the treated water to the existing pipelines of Roseville and Northridge. PCWA, Roseville and Northridge would share the 12-mile pipeline.

- A 60" intertie that connects the existing pipelines of Northridge and Roseville. The total length of this intertie is about 3 miles.

[5] Parties to the litigation (*Environmental defense Fund et al. v. East Bay Municipal Utility District*) could not divert water from the American River unless instream flows measured at least 2,000 cfs from October 15 through February, 3,000 cfs from March through June, and 1,750 cfs from July through October 14.
[6] The capacity of Natomas' diversion at Elkhorn would be 215 cfs.

- A 42" intertie that connects the existing pipelines of Northridge to the proposed 84" pipeline, respectively. The total length of this intertie is about 2 miles.

- A 66" intertie that parallels the 84" intertie along Elverta Road, and then continues along Truxel Road and West El Camino Road to the planned 54" pipelines leading to the Fairbairn and Sacramento River WTPs. The City of Sacramento would use this 8-mile pipeline.[7]

Water Rights and Contract Entitlements

The water rights and CVP entitlements[8] involved in the proposed Project are those of PCWA and the City of Sacramento. The City of Sacramento holds water rights on the American River and the Sacramento River that precede construction of the CVP. Reclamation and the City of Sacramento entered into an operating contract on June 28, 1957 related to Folsom and Nimbus Dams and their related works and to diversions of water by the City of Sacramento. The quantity of water that the City of Sacramento can divert from the American River was limited by a gradually increasing schedule in the contract. Currently, the maximum amount is 140,500 AF/year, of which 31,000 AF/year is from the Folsom Lake. The corresponding amounts of water in year 2030 are 245,000 and 90,000 AF/year, respectively. In the proposed Project, the City of Sacramento would divert from their water rights.

PCWA has about 120,000 AF/year of water right on the American River from their Middle Fork Project (MFP) with authorized diversion points at Folsom Dam and the American River Pump Station near the Auburn Dam site. PCWA also negotiated a long-term CVP water service contract with Reclamation through the CVP long-term contract renewal process that stipulates 35,000 AF/year of M&I water delivered at Folsom Dam or other mutually agreed locations. The water service contract would be executed after the completion of the American River Basin Unit EIS and the ESA consultation in March 2002. Northridge and Roseville have water sale agreements with PCWA for 29,000 AF/year and 30,000 AF/year of MFP water delivered at Folsom Dam.

In the proposed Project, PCWA would divert their CVP entitlement of 35,000 AF/year at the Elkhorn Diversion. This requires an amendment to the current negotiated contract to include the location as one of the mutually agreed locations for delivery. Northridge and Roseville would divert their 29,000 AF/year and 7,000 AF/year, respectively, through an exchange of MFP water and CVP delivery. That is, Northridge and Roseville would receive CVP deliveries at the Elkhorn Diversion, and the same amount of water would be released from the MFP to Folsom Lake for Reclamation's use. This requires an amendment to their individual Warren Act contracts to include the Elkhorn Diversion as one of the mutually agreed locations for delivery.

Related Programs and Projects

The proposed Project has a long history of development and involves the cooperation of many agencies. The proposed Project is related to many previous and on-going efforts in the American River basin, the greater Sacramento metropolitan area, and California statewide. Major programs and projects in the northern American River basin and others that may significantly relate to the proposed Project are discussed in Appendix A and a summary is provided below.

[7] It is also possible to combine the 66" pipeline with the 84" pipeline for PCWA, Roseville and Northridge into one pipeline along Elverta Road. The length of this section of pipeline would be about 6 miles. The final configuration of pipeline would be dictated by economic factors.
[8] CVP entitlements are used pursuant to CVP water rights.

1. **Programs and projects that are previously completed and provide the basis for the proposed Project.** These programs and projects include the ARWRI and the Water Forum Agreement. The local sponsors of the proposed Project are all signatories of the Water Forum Agreement, which provides planning and operational guidelines for many on-going regional efforts and supports the development of the proposed Project. The ARWRI evaluated the alternatives to meet the project 2030 demands in Sutter, Placer, Sacramento, El Dorado and San Joaquin Counties, focusing on the comparison between a new surface reservoir and a large conjunctive use program. The Water Forum Agreement focuses on the diversions from the American River, the groundwater conjunctive use opportunities and water conservation opportunities in the North American River basin, and habitat management efforts in the lower American River. The analyses resulting in the Water Forum Agreement are largely based on the ARWRI, but with more refinements on local operations and issues. The operation of the proposed Project is not addressed in the Water Forum Agreement.

2. **Programs and projects that are ongoing and provide the basis for the proposed Project.** These programs and projects mainly relate to the needed contractual agreements for the implementation of the Sacramento River Diversion Project including the *Central Valley Project Long-term Contract Renewal*, and other inter-agency agreements for water sale, water wheeling, and project operation. Many of these agreements would need modifications in order to implement the diversion on the Sacramento River and additional agreements among agencies and local entities would be required to implement the proposed Project.

3. **Programs and projects that are ongoing to implement parts of the Water Forum Agreement, of which the proposed Project could be an integrated component**. These programs and projects include the *American River Basin Cooperative Agencies Regional Water Master Plan*, and *PCWA/Northridge Groundwater Stabilization Program*. These programs and projects were developed based on the Water Forum Agreement, and the proposed Project would provide alternative water sources to the area for dry year protection and system reliability.

4. **Programs and projects that are ongoing to implement parts of the Water Forum Agreement, whose subsequent efforts would provide backup solutions if the proposed Project cannot be implemented**. These programs and projects include the *PCWA American River Pump Station Project* (the subsequent efforts would expand the capacity of diversion) and *City of Sacramento Water Facilities Expansion Project* (the subsequent efforts would restore part of the dry-year reductions at existing diversion locations or develop alternative sources of water to provide needed system redundancy).

5. **Programs and projects that are ongoing and could affect or be affected by the planning and implementation of the proposed Project.** These programs and projects include the *Natomas American Basin Fish Screen and Habitat Improvement Project*. The proposed Project would use one of the consolidated Natomas diversions, the Elkhorn Diversion. It could benefit the environment and the project financing if the two projects are combined or at least coordinated in an integral manner.

6. **Programs and projects that are ongoing but may have limited effects on the proposed Project**. These programs and projects include the *U.S. Corps of Engineers American River Watershed Project*. The proposed Project may need to take into consideration of the levee and channel modification in Natomas area for the American River Watershed Project.

7. **Programs and projects that are ongoing on a statewide or Sacramento Valley-wide level and provide operational criteria and standards for statewide water supply operation or new water supply scenarios in the future**. These programs and projects include the *CALFED Bay-Delta Program*, *Central Valley Project Improvement Act*, and *Sacramento and San Joaquin River Basins Comprehensive Study*. These programs and projects may impact the statewide water supply; however, the recommendations from these programs and projects are still under development. The progress of these programs and projects would need to be monitored for any possible impacts to the construction and operation of the proposed Project.

CHAPTER 3. SACRAMENTO RIVER DIVERSION PROJECT FEASIBILITY STUDY

STUDY STRATEGIES

The Study is the first phase of the project-specific actions taken by the local sponsors and Reclamation. The Study includes the engineering feasibility analysis, preliminary design, environmental documentation, and public involvement program. The Study will tier off the programmatic ARWRI EIS and Water Forum EIR to address the proposed surface water diversion. Other regional planning efforts that have been considered and evaluated in the previous programmatic efforts, such as wastewater reclamation and conjunctive use programs, would not be included in the Study.

The Study will be conducted consistent with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G). An iterative process is used to refine alternatives to arrive at a National Economic Development (NED) plan or preferred plan that reasonably maximizes net NED benefits with acceptable impacts to the ecosystem and human environment. The results of the Study will be sent to Congress for consideration of possible implementation.

The Study will be integrated with the processes and requirements of the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the federal and State Endangered Species Acts (ESA), Fish and Wildlife Coordination Act, the National Historical preservation Act (NHPA), and other applicable environmental regulatory requirements. Reclamation will be the Lead Agency for the NEPA process and PCWA will be the leading agency for the CEQA process.

The Study will consist of three major inter-related categories of efforts: feasibility evaluation, environmental review, and public involvement. The findings and recommendations of the Study will be documented in a combined Planning Report/EIS/EIR document with supplemental information in appendices. The Planning Report/EIS/EIR will be submitted to Congress and other relevant agencies for the possible implementation of the preferred alternative.

FEASIBILITY EVALUATION

The feasibility evaluation for the proposed Project will be conducted in conjunction with the preparation of environmental documentation. However, the feasibility evaluation will focus more on compliance with the P&G. Two documents have been identified to document the feasibility:

- Planning Report
- Preliminary Design Report

Details of these two reports are discussed below.

Planning Report

The objective for federal water resources project planning is to contribute to national economic development consistent with protecting the Nations' environment, pursuant to national environmental

statutes, applicable executive orders, and other federal planning requirements. The planning report will document the benefit evaluation of the proposed Project following the P&G guidelines.

The Planning Report will be organized as follows:

- Settings
- Demands
- Alternative formulation and screening
- Alternatives description
- Special considerations in legal and water right issues
- Economic analysis, plan selection, and financial analysis

Settings

The settings will describe the without-project condition. The without project condition is the most likely condition expected to exist in the future in the absence of the proposed Project, including known changes in law or public policy. Several specific elements associated with the water supplies to PCWA, Northridge, Roseville, and the City of Sacramento should be included in the without-project condition:

- Existing water supplies and potential additional water supplies that are under construction or authorized and likely to be constructed.
- Water quality and probability of delivery for each source of water supply.
- Institutional arrangements regarding the existing and future water systems and water contracts and operating criteria.
- Nonstructural measures, conservation, and use of reclaimed water that are reasonably expected to be implemented.

Demands

The projection of demands and supply is related to the projection in regional General Plans, which would be used in the evaluation of growth-related impacts. The demand review would be conducted in junction with the review of General Plans to verify the demand projections for PCWA, Northridge, Roseville, and the City of Sacramento. The projected 2030 demands in the ARWRI were based on DWR's estimates. The projected 2030 demands specified in the Water Forum Agreement were derived through a land use-based water demand estimate process. However, these demands were prepared individually for each of the agencies, using in some cases, different assumptions, underlying data sources, and methodologies.

As part of the development of the American River Basin Cooperating Agencies (ARBCA) Regional Water Master Plan (RWMP), the demand projections were re-examined for the participating agencies. The resulting 2030 demand is 70,000 to 80,000 AF/year for PCWA, 19,500 to 20,400 AF/year for Northridge, 54,900 AF/year for Roseville, and 64,100 AF/year for the City of Sacramento (north of the American River only). While PCWA's average demand remains unchanged from the Water Forum estimate, the range of demand reflects the uncertainty associated with potential increased agricultural use due to recent improvements in PCWA's distribution system. Northridge's demand estimate is slightly increased from that in the Water Forum Agreement. The estimates for Roseville and the City of Sacramento remain unchanged.

The City of Sacramento's demand estimate was completed through the Water Forum effort and thus, it is more recent than that of other water purveyors. Northridge's estimate was based on a 1991 master

plan. Currently, PCWA is developing a new water master plan, and Roseville is updating its water master plan. Their projected 2030 demands are likely to change after these efforts. It is necessary to have updated water demand projections based on the changes following execution of the Water Forum Agreement.

Alternative Formulation and Screening

Both the ARWRI and the Water Forum Agreement evaluated programmatic alternatives that included measures to (1) reduce the demand for water; (2) improve efficiency in water use and reduce losses and waste; (3) improve land management practices to conserve water; and (4) increase the available supply of water. The Sacramento River Diversion Project is one of the measures selected to reduce the demand for water from the American River, improve efficiency in water use through conjunctive use, and increase the available supply of water. The alternatives to be evaluated for feasibility in this Study will be alternative locations, sizes, designs, and operations of a new surface water diversion that would achieve similar objectives as originally considered in the programmatic analysis to some degree.

Alternative plans will be formulated in a systematic manner to ensure that all reasonable alternatives are evaluated to meet the requirements of NEPA and P&G. These alternatives may include:

- A plan that reasonably maximizes net NED benefits (the NED plan).
- Other plans that reduce net NED benefits in order to further address other federal, State, and local concerns not fully addressed by the NED plan.
- Plans that require changes in existing statutes, administrative regulations, and established common law.

Each alternative plan should be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. Appropriate mitigation of adverse effects is to be an integral part of each alternative plan.

The full range of alternatives would be screened using criteria developed by Reclamation, the local sponsors, and the project team, to consider public concerns, environmental protection, and project purposes. The finalization of the criteria will be the responsibility of Reclamation and local sponsors.

The purpose of developing alternative screening criteria is to facilitate informed decision making by allowing a clear delineation of the tradeoffs between the various potential plan components and the various alternatives. Goals and screening criteria would be developed in the following general categories:

- Operations and engineering
- Legal and regulatory
- Economic
- Sociocultural (otherwise referred to as the human environment)
- Biophysical (otherwise referred to as the natural environment)

The screening criteria for each of the above categories would be further divided into two groups:

- **Exclusionary criteria** to identify project components that would not contribute to achieving the objectives of the proposed Project.
- **Evaluation criteria** to measure the degree to which potential project components would likely meet the objectives of the proposed Project.

Water rights and legal entitlements would be the basic elements of alternative formulation. The proposed Project could provide system redundancy to local sponsors, resulting in alternative diversion points on either the American River or Sacramento River. The operation criteria for these diversions would be defined for each alternative during the Study. Possible alternatives to the proposed Project and their corresponding project components include the following:

- **Sacramento River Diversion Alternative – Elkhorn Diversion (Proposed Project)**
  - PCWA diverts 35,500 AF/year of MFP water at their American River Pump Station, and 35,000 AF/year of CVP entitlement at Elkhorn Diversion on the Sacramento River.
  - Roseville diverts 23,000 AF/year of MFP water at Folsom Dam, and 7,000 AF/year of MFP water at Elkhorn Diversion on the Sacramento River.
  - Northridge diverts 29,000 AF/year of MFP water at Elkhorn Diversion on the Sacramento River.
  - The City of Sacramento diverts 100 mgd of settlement contract water at the Fairbairn WTP, and 100 mgd of settlement contract water at the Elkhorn Diversion.
  - A treatment plant and intertie pipelines with a capacity of 228 mgd for delivery to PCWA, Roseville, Northridge, and the City of Sacramento.

- **Sacramento River Diversion Alternative – Alternative Location**
  - PCWA diverts 35,500 AF/year of MFP water at their American River Pump Station, and 35,000 AF/year of CVP entitlement at an alternative location on the Sacramento River.
  - Roseville diverts 23,000 AF/year of MFP water at Folsom Dam, and 7,000 AF/year of MFP water at an alternative location on the Sacramento River.
  - Northridge diverts 29,000 AF/year of MFP water at an alternative location on the Sacramento River.
  - The City of Sacramento diverts 100 mgd of settlement contract water at the Fairbairn WTP, and 100 mgd of settlement contract water at the Elkhorn Diversion.
  - A treatment plant and intertie pipelines with a capacity of 128 mgd for delivery to PCWA, Roseville, and Northridge.
  - A treatment plant and intertie pipelines with a capacity of 100 mgd for delivery to the City of Sacramento.

- **American River Diversion Alternative**
  - PCWA diverts an additional 35,000 AF/year of MFP water at their American River Pump Station. (The total diversion at the American River Pump Station is 70,500 AF/year.)
  - Roseville diverts 30,000 AF/year of water at Folsom Dam using the combination of MFP water and PCWA's CVP entitlement.
  - Northridge diverts 29,000 AF/year of MFP water at Folsom Dam.
  - The City of Sacramento diverts 200 mgd of settlement contract water at the Fairbairn WTP.
  - A treatment plant with a capacity of at least 54 mgd for the PCWA diversion and intertie pipelines.

- **Feather River Diversion Alternative**
  - PCWA diverts 35,000 AF/year of CVP entitlement from the Feather River through a water exchange with the SWP.

- Roseville diverts 23,000 AF/year of MFP water at Folsom Dam, and 7,000 AF/year of MFP water from the Feather River through a water exchange with the SWP.
- Northridge diverts 29,000 AF/year of MFP water from the Feather River through a water exchange with the SWP.
- The City of Sacramento diverts 100 mgd of settlement contract water at the Fairbairn WTP, and 100 mgd of settlement contract water at the Elkhorn Diversion.
- A treatment plant and intertie pipelines with a capacity of 128 mgd for delivery to PCWA, Roseville, and Northridge.
- A treatment plant and intertie pipelines with a capacity of 100 mgd for delivery to the City of Sacramento.

These alternatives would be refined or modified, and additional alternatives may be added during the Study. Alternative evaluation would be performed through the preparation of the EIS/EIR.

Legal Issues and Water Rights Review

The purposes of legal issues and water rights review is to identify (1) the degree of applicability of various water laws, water right decisions, and water service contracts and agreements; (2) the areas that need to be modified or enhanced for the implementation of the proposed Project; and (3) the applicable constraints for water supply analysis for the proposed Project. The review would include the following subjects:

- **Water rights and related decisions or orders by the State Water Resources Control Board (SWRCB)** – The water rights that will facilitate the proposed Project include those of PCWA (MFP), the City of Sacramento, and Reclamation. The City of The City of Sacramento has water rights that are senior to those of Reclamation. PCWA MFP water rights are junior to CVP rights at Folsom; however, PCWA has an area-of-origin priority to the CVP rights at Folsom to the extent that the diversions are used within their authorized place of use and to the extent that CVP water released from Folsom Lake is being used for Delta exports. Both PCWA and the City of Sacramento have entered into operating contracts and settlement contracts with Reclamation to protect their mutual interests. These agreements may not be sufficient for implementation of the proposed Project. For example, the Elkhorn Diversion is currently not an authorized point of diversion in these agreements.

  In addition, the SWRCB may impose additional constraints on the exercise of these water rights. For example, the SWRCB has issued two orders for MFP water rights for expanding the place of use to include the service area of Northridge. Included in these orders is the compliance with the provisions in the related settlement agreements with various agencies and entities. These provisions are largely consistent with the Water Forum Agreement; however, additional limitations in operations of MFP reservoirs and the Northridge diversion with a Sacramento River diversion could further restrict water availability.

- **Water service contracts and agreements** – The related CVP contracts and interagency water sale agreements provide the basic contractual agreements that are needed to implement the proposed Project. These contracts are discussed in detail in Appendix A. However, these contracts and agreements may not be sufficient to address all contractual needs for the implementation of the proposed Project because the proposed Elkhorn Diversion would be a new point of diversion in these contracts and agreements. In addition, agreements between local sponsors and Natomas would be needed to use the Elkhorn Diversion and its capacity.

- **Instream flow requirements** – Instream flow requirements are also operational constraints or water needs on the system. There are two SWRCB water right decisions that affect the instream flow requirements in the American River: D-893 and D-1400. The requirements in D-1400 are contingent upon the construction of Auburn Dam; however, Reclamation operates Folsom Dam to meet D-1400 standards when hydrologically favorable, and operates Folsom Dam somewhere between the D-893 and D-1400 standards. Instream flow requirements in the American River were also established through the Anadromous Fish Restoration Program (AFRP) to establish flow objectives for the enhancement of fisheries production that would conform to the goals of the Central Valley Project Improvement Act (CVPIA). In addition, the Water Forum Agreement contains provisions of "replacement waters" associated with the PCWA-Roseville water sale and PCWA's diversion at the American River Pump Station.

  The SWRCB water right decision 1641 (D-1641) and other interim decisions have adopted the 1995 Sacramento-San Joaquin Delta Water Quality Control Plan (WQCP), which established flow and water quality objectives in the Delta and operational contracts for Delta exports. Currently, the CVP and SWP will meet the flow objectives until the Bay-Delta Program Phase 8 negotiation is completed.

- **Area of origin statutes** – The California Water Code contains a number of sections addressing certain rights and obligations of areas in which water originates. These statutes, known as the "area of origin statutes" or the "watershed protection act(s)", provide the prior right to water supply to areas immediately adjacent to the watershed in which water originates. The right shall not be deprived by construction or operation of the SWP, CVP, and other Delta exports. The applicability of the area of origin statutes would be evaluated for the proposed Project.

- **Public Trust Doctrine** – The water supply would be further limited if SWRCB orders or other legal judgments are issued under the public trust doctrine. An example of this application is the judgment, commonly known as the "Hodge Decision," by the Alameda County Superior Court in *Environmental Defense Fund v. East Bay Municipal Utility District (EBMUD)* concerning EBMUD's diversions on the American River. The decision weighed the interests of EBMUD in providing a secure, high quality water source for municipal use against the instream flows required to maintain environmental values in the Lower American River. The decision established limitations on EBMUD's diversions from the river, and substantially reduced the availability of water to EMBUD under its CVP contract.

- **Pending litigation and water rights applications –** Pending litigation and water rights applications related to the American River may potentially impact the operation of the proposed Project. If identified, the potential impacts from these pending litigation and water rights applications should be evaluated.

Economic Analysis

The economic analysis would be performed consistent with the P&G. One of the factors used in formulating and selecting a preferred Federal water resources alternative is an economic analysis comparing the attributes of NED benefits with the costs of their implementation. Project benefits are the increase in the economic value of the national output of goods and services resulting from an alternative. An alternative is "economically justified" if the benefit/cost comparison results in positive net benefits.

- **Cost Evaluation** – The Study will be a joint effort between Reclamation and local cost-sharing sponsors (currently, PCWA and the City of Sacramento). Therefore, the scope and plan formulation process should fully consider local water-related resources problems. The cost for constructing a water treatment facility and connecting pipelines, developed through the preliminary design tasks, will be included in the benefit cost analysis. The costs of the selected plan will include post-authorization planning and design costs, construction costs, construction contingency costs, administrative services costs, fish and wildlife habitat mitigation costs, reallocation cost, historical and archaeological salvager operation costs, land and water rights costs, and operation and maintenance costs.

- **Benefit Evaluation** – Because the proposed Project would reduce groundwater reliance of the City of Sacramento and Northridge during normal years, one major benefit of the proposed Project will be related to groundwater. Some of the potential benefits such as the avoidance of groundwater pumping cost can be quantified and will be included in the economic analysis. Other benefits that cannot be quantified will be described in the analysis. An example of this type of benefit is prevention of the deterioration of groundwater quality associated with falling water tables. P&G stipulates that the benefit of M&I water supply should be evaluated by using marginal willingness to pay for the increase in the value of goods and services attributable to the water supply. If the marginal willingness to pay is not available, the benefits from a water supply plan are measured instead by the resource cost of the alternative most likely to be implemented in the absence of that plan.

The areas of risk and uncertainty in the alternative analysis should be identified and documented clearly so that the decision can be made with knowledge of the degree of reliability of the estimated benefits and costs and of the effectiveness of the alternative plans.

Plan Selection

The plan recommending federal action will be the alternative plan with the greatest net economic benefit consistent with protecting the Nation's environment (the NED plan), unless the Secretary of Interior grants an exception to this rule. The exceptions may be made when there are overriding reasons for recommending another plan, based on other federal, State, and local concerns. A regional preferred plan will also be selected if it differs from the NED plan.

Potential federal decisions to be made include issuing a 404(b)(1) permit, modifying CVP contracts or entering into transfer agreements, and funding construction. The NED plan selection is only required for funding construction. The regionally preferred plan may or may not coincide with the NED plan. If the project sponsors adopt an alternative that is not the NED plan, they will forgo any potential federal construction funding.

Financial Analysis

The purpose of a financial analysis is to identify the potential sources of funding for the implementation of the selected plan. There may be federal programs that could pay at least a portion of the planning and construction costs, but the costs of annual operation and maintenance and periodic construction replacement would be a local responsibility.

Preliminary Design Report

The feasibility evaluation includes a preliminary design of the proposed Project. The preliminary design efforts will result in a design of a diversion facility, a water treatment facility, and connecting

pipelines to 30-percent completion. The cost estimate of the proposed Project will be refined through the preliminary design and used in the economic analysis mentioned previously. A preliminary design report shall be prepared to document:

- Flows and design criteria
- The relationship with the consolidated Natomas' diversion at Elkhorn
- Hydraulic analysis
- Alternative alignment analysis
- Environmental concerns
- Hazardous material concerns
- Construction methods and costs
- Traffic control
- Geotechnical field investigation
- Design drawings of 30-percent completion

ENVIRONMENTAL REVIEW AND DOCUMENTATION

The key objectives of the environmental review and documentation tasks are to document and disclose analysis of the issues, alternatives, and impacts of the proposed Project to the decision-makers and the public. The process will support the engineering/design development process, evaluate the effects of the project components on environmental resources, and provide information to the decision-makers on environmental impacts and related mitigation requirements. The environmental review process and documentation must comply with all provisions of both the NEPA and CEQA, and they must support federal and State resource agency in compliance with the ESA and other State and federal laws. The environmental review and documentation will include several major elements:

- Initial Environmental Study
- Notice of Intent/Notice of Preparation
- Environmental Impact Statement/Environmental Impact Report
- Fish and Wildlife Coordination Act Report
- Biological Assessment

Many of these elements will be prepared in conjunction with the feasibility evaluation. Each of these elements is briefly described below.

Initial Environmental Study

The objective of an initial environmental study is to provide early information on the sensitive environmental resources occurring in the area, and the kinds of impacts and mitigation measures that can be expected for the principal proposed actions, and to assist in the development of the detailed project descriptions necessary for the EIS/EIR analyses.

This task will include field reconnaissance, joint consideration of information on existing conditions, and review of major proposed facilities/actions. It will result in the preparation of a summary document on sensitive resources, major potential impacts, and available mitigation strategies and measures. It will include the definition of not only the major facilities, but also the associated facilities, such as access roads, borrow areas, transmission lines, pipelines, process water treatment/disposal, tunnel muck disposal, and construction laydown and staging areas.

A variety of preliminary facility placement and design options will be developed through an iterative process to avoid or reduce environmental impacts. The preliminary design and placement options considered but rejected shall be documented for possible inclusion in the EIS/EIR as "alternatives considered but not evaluated in detail."

Notice of Intent/Notice of Preparation

The objective of a Notice of Intent/Notice of Preparation (NOI/NOP) is to meet the federal and State legal requirements and to establish a clear path for the EIS/EIR in addressing the key issues (e.g., alternatives, baseline, and the relationship of this EIS/EIR to other planning efforts, including Habitat Conservation Planning by local jurisdictions).

The NOI/NOP will be organized as follows:

- Project Description and Background
- Project Alternatives
- Scoping Process
- Current and Future without Project Conditions
- Potential Environmental Impacts/Issues
- Other Planning Processes

The NOI/NOP will be prepared while the project descriptions, including the facility design and placement alternatives, are developed under the project feasibility evaluation. It will include work products developed in the first phase of the Initial Environmental Study, along with additional information developed specifically for the NOI/NOP. The NOI/NOP will contain the following:

- **Project Description and Background.** This section will describe the project and include a description of the project location and relevant study areas for direct and indirect impacts, the tiering relationship to the Water Forum Plan EIR and the ARWRI EIS, the project purpose and need (CEQA objectives), and the relationship of the project to ongoing planning activities by local jurisdictions, in particular habitat management planning.

- **Project Alternatives.** This section will describe the concepts and categories of project alternatives that will be evaluated in the EIS/EIR, and will invite comments from the public and agencies.

- **Scoping Process.** This section will describe the scoping process and the potential dates and locations of scoping meetings.

- **Current and Future without-Project Conditions.** This section will describe the current and future water demands and supply of the American River, and the conditions that would be used to determine whether environmental impacts are "significant." Deciding on the basis for comparison is frequently an important and controversial component in developing an EIS/EIR. Having a draft statement of the baseline would help expose any major differences of opinion early in the process, and help the team develop an approach that will be acceptable to the key participants. A possible future without-Project condition may be defined as:

    - PCWA diverts 35,500 AF/year of MFP water at their American River Pump Station
    - Roseville diverts 30,000 AF/year of MFP water at Folsom Dam
    - Northridge diverts 29,000 AF/year of MFP water at Folsom Dam

  - The City of Sacramento diverts 200 mgd of settlement contract water at the Fairbairn WTP

- **Potential Environmental Impacts/Issues** will build upon the information developed in the first phase of Initial Environmental Study. The purpose of this subsection is to inform the agencies and the public about the areas of potential impact considered to be important for the EIS/EIR, and to identify any areas of potential concern that are considered to require little or no additional analysis. This is in conformance to Section 15082(c) in the CEQA Guidelines for NOP preparation.

- **Other Planning Processes** will explain the approach taken in the EIS/EIR to habitat management planning, and the expectations regarding the use of existing Habitat Conservation Plans (HCPs) and other local habitat planning efforts to address the indirect impacts of the proposed actions. The purpose of this subsection is to explain at the start of the EIS/EIR preparation process the approach that will be taken, and to encourage early discussion. Having this discussion in the NOI/NOP will help in defending the approach against latecomers when it appears in the Draft EIS/EIR.

Environmental Impact Statement/Environmental Impact Report

The EIS/EIR is to disclose the impacts of the proposed Project in compliance with NEPA and CEQA, providing the federal and State decision-makers and the public with the information necessary to make an informed decision. The EIS/EIR will be prepared in coordination with the feasibility evaluation.

The EIS/EIR will avoid duplicating past and parallel efforts. It will be tiered off previously certified/completed program-level documents, including the Water Forum Plan EIR and the ARWRI EIS. It will consider information being developed in parallel processes and environmental documents. The EIS/EIR will be coordinated with the HCPs currently being developed within the affected service areas.

The EIS/EIR will be organized to comply with the content requirements of both NEPA and CEQA. The advantages and disadvantages of several organizational options will be evaluated. As an example, the following is a slightly modified version of an outline suggested in a CEQA Guidelines appendix on joint federal/State documents:

- Cover Sheet
- Summary
- Purpose of and Need for Action
- Project Description
- Alternatives Description
- Environmental Setting
- Environmental Impacts
- Mitigation Measures
- Economic and Social Effects (optional)
- Growth-Inducing Impacts
- Cumulative Impacts
- Unavoidable Adverse Impacts
- Short-Term Vs. Long Term Uses/Productivity
- Irreversible/Irretrievable Commitments
- List of Preparers

- Organizations and Persons Consulted
- Response to Comments
- List of Commentators

Impact Assessment Framework and Methodology

The EIS/EIR will evaluate and compare the impacts of the proposed Project and other alternatives developed through the scoping process. NEPA and CEQA require consideration of a full range of reasonable alternatives. NEPA requires equivalent levels of analysis for the alternatives, while CEQA focuses on the specific components of the alternatives that can reduce or eliminate the significant impacts associated with the proposed Project.

The impact assessment will cover three types of effects within the local and regional setting: (1) impacts related to construction and operation of the facilities, (2) diversion-related effects, and (3) indirect impacts relating to growth inducement. The facilities impacts are localized, and are mostly construction-related; the potential effects of increased diversion are long-term and may affect environmental resources beyond the local project area. And the indirect, growth-inducing impacts are the indirect, long-term impacts on environmental resources in the service area from future urbanization and development made possible by the proposed Project.

The diversion-related impact assessment will involve the usage of computer models. The model assumptions and limitations shall be documented in detail. The identified models that will be used in the Study include the CALSIM model that simulates the statewide water supply operation including the SWP and CVP, and the Upper American River Model (UARM) that simulates the American River system upstream of Folsom Lake. The California Department of Water Resources (DWR) is currently integrating the UARM into CALSIM. If an integrated CALSIM is available during the early period of the Study, it will be the preferred tool for hydrologic simulations and the UARM will not be used. The project team will identify other models to assist in impact assessment as needed.

The water supply from the proposed Project could eliminate an existing constraint to population growth within Placer County and Sacramento County, causing increased demand for public services, housing, commercial uses, and infrastructure, such as roads, sewers, treatment facilities, electric transmission and distribution. The EIS/EIR will evaluate the potential for growth inducing impacts by reviewing current and adopted planning programs within the service areas. This evaluation will build upon the past and current planning processes within the service areas, including the applicable General Plans and General Plan EIRs. Where indirect effects due to population growth have already been evaluated within a public process, the EIS/EIR will incorporate this information by reference, assess the impacts of the proposed water diversion, and recommend appropriate mitigation measures. The EIS/EIR will also evaluate the potential effects of population growth in service areas not covered by current General Plans and associated EIRs. In this instance, the EIS/EIR will assess the indirect impacts of the proposed Project, and identify mitigation measures to be incorporated into the General Plan development or updating process, and to be implemented by the affected jurisdictions.

Environmentally Preferable Alternative

NEPA also requires the identification of the "environmentally preferable alternative" in the Record of Decision (ROD). The environmentally preferable alternative determined by Reclamation is the alternative that: 1) causes the least damage to the biological and physical environment; and 2) best protects, preserves, and enhances historic, cultural, and natural resources.

Environmental Evaluation

The specific scope for each environmental area will be determined by Reclamation and local sponsors at the completion of the scoping process. Some initial information on the key areas of evaluation is provided below.

Water Supply and Hydrology

The proposed Project would move several future diversions on the American River to the Sacramento River. The CVP would be the source of diverted water and MFP water would be released to Folsom Lake for Reclamation's use. The proposed Project would reduce the groundwater reliance of local sponsors. The changes in diversion location, amounts and water source may have impacts on the surface and groundwater hydrology in the Sacramento River Basin, thereby affecting the water supply scenarios on local and regional scales.

The water supply and hydrology impact assessment would include:

- Identification of impacts on flows in the Sacramento River, the American River, and the Delta.
- Identification of impacts on the groundwater basin underlying northern Sacramento and southern Placer counties.
- Identification of impacts on both the CVP and SWP water supplies. Impacts to a CVP or SWP contractor may vary depending on the diversion location, contract type, and entitlement priority.
- Identification of impacts on water supplies to water right holders on the Sacramento and American rivers.
- Identification of impacts on water supply and reliability of PCWA, Northridge, Roseville, and the City of Sacramento.

The water supply and hydrology impact assessment will be used as an input or basis for the other assessments in the EIS/EIR.

Water Quality

The proposed Project would change the instream flows and their pattern in the American and Sacramento Rivers. The EIS/EIR will analyze the potential impacts on water quality in these rivers.

Historically, water quality parameters for the Lower American River have been well within acceptable limits to achieve water quality objectives and beneficial uses identified for this water body, and remain so today. Principal water quality parameters of concern for the river (e.g., pathogens, nutrients, total dissolved solids (TDS), total organic carbon (TOC), priority pollutants, and turbidity) are primarily affected by urban land use practices and associated runoff and storm water discharges. The storm water discharges to the river temporarily elevate levels of turbidity and pathogens during and immediately after storm events. TOC and TDS levels in the Lower American River are relatively low compared to the Sacramento River and Delta waters and thus, are generally not of concern.

The Lower Sacramento River receives urban runoff, either directly or indirectly (through tributary inflow), from the cities of Sacramento, Roseville, and their surrounding communities. The Natomas

East Main Drainage Canal discharges to the Sacramento River immediately upstream of the confluence with the American River. This canal transfers both agricultural discharges and urban runoff into the Sacramento River. Monitoring studies have occasionally shown certain priority pollutants (e.g., trace metals and pesticides) to be at concentrations above State water quality objectives in portions of the Sacramento River. However, this may be of less concern to the Project since the proposed diversion location, Elkhorn Diversion, is upstream from the drainage discharge location.

Another area that may exhibit water quality impacts from the proposed Project would be the groundwater basin underlying northern Sacramento and southern Placer counties. The proposed Project would reduce the groundwater pumping in wet years and facilitate conjunctive use programs in the region. The increased groundwater elevation may mobilize the known contaminant in the currently unsaturated zone although the possibility is very low due to the limited groundwater level fluctuation caused by the proposed Project.

The water quality evaluation will describe the existing conditions in the affected rivers, including seasonal variability, and assess the potential effects of the proposed Project on water quality. The evaluation will include the following:

- Identify potential water quality changes in the American and Sacramento rivers during construction. Sediment and erosion will be the major concerns.

- Identify potential water quality changes in the American and Sacramento rivers. The operation of the proposed Project would not discharge pollutants into the rivers, but the reduction in river flow could cause changes in the water quality, including temperature, dissolved oxygen, and other parameters that are important to aquatic biology and the Basin Plan[9] compliance.

- Evaluate the potential movement of known contamination due to elevation changes in the groundwater basin underlying northern Sacramento and southern Placer counties.

Fisheries Resources

The aquatic habitats of the Central Valley support a diversity of fish species, including cold-water and warm-water fisheries. Key aquatic sites within the project area are Folsom Lake, Lake Natoma, the American River, the Sacramento River (and tributaries), and the Delta. Species occurring at these sites include nonnative sport fish such as sunfish, crappie, catfish, largemouth bass, smallmouth bass, striped bass and American shad; and special status native species such as steelhead, fall-run, late-fall run, winter-run and spring-run Chinook salmon, Delta smelt, Sacramento splittail, longfin smelt, hardhead, and green sturgeon.

Previous investigations have identified the following factors potentially affecting fish abundance within the project area: water temperature, seasonal instream flow conditions, reservoir water level fluctuations, water quality, prey availability, and habitat quality (e.g., spawning sites, shaded riverine aquatic habitat, etc). In addition, site-specific instream construction activities may cause short-term disturbances to fish and aquatic habitat.

[9] The Basin Plan is the Water Quality Control Plan issued by the Central Valley Regional Water Quality Control Board (RWQCB) in 1994 for the water quality management in the Sacramento River Basin.

The impact analysis will be based on the results of previous investigations, supplemented with site-specific data collection to address the following issues:

- The potential impacts on threatened and endangered fish from construction and operation of the proposed Project, including any project induced agricultural or urban development. Studies would be conducted as needed in accordance with methodologies recommended by fisheries agencies for listed threatened or endangered species or their potential habitat.

- The need for a monitoring program designed to detect changes in fisheries resources due to the construction, operation, and maintenance of the proposed Project.

Flood Management

Within Placer and Sacramento counties, flood management on the American and Sacramento rivers has been an issue of regional importance. The flood management infrastructure of the Central Valley includes several key reservoirs, designated floodways, and miles of levees on major rivers. Localized flooding in Sacramento County is managed by a system of drains and pumping plants. This infrastructure is managed in coordination with federal, State, and local agencies. Changes to the local flood management infrastructure or flooding conditions could result in increased or decreased 1) exposure to flood hazard; 2) stress on flood control infrastructure; and 3) ability to meet flood control management criteria. Key issues to be analyzed in the EIS/EIR include:

- Impacts on flood management programs resulting from changes in instream flow patterns.

- Impacts on the flood operation of Folsom Lake.

- Impacts on the ongoing flood management activities, including land use designations and compatibility, easements, and rights-of-way.

Vegetation and Wildlife

Riparian plant communities have been preserved along the Lower American River. Protected areas cover several hundred acres and include a range of riparian community types, including elderberry savanna, cottonwood gallery forest, and great valley oak forest. The Sacramento River is narrowly confined with a system of levees that allow for limited riparian habitat between the water and crest of the levees. Much of the area along the Sacramento River has been converted to urban and agricultural land uses.

Habitat types within the proposed Project area reflect the topographic transition from foothill to valley floor. The upper elevations are characterized by dynamic topography with variety of slopes and aspects, that support several types of oak woodlands, chaparral, rolling grassland, and riparian habitats associated with steep-gradient streams. Lower elevations of the proposed Project area are consistently lower relief and support the following natural communities: oak savanna, emergent wetlands, non-native grassland with associated vernal pools, and floodplains with a diverse assemblage of riparian plant communities.

These habitat types of the foothill and valley regions provide for local populations of resident wildlife and migratory bird species. Resident wildlife includes native and introduced amphibians, reptiles, mammals, and a diversity of bird species. During the spring and fall migration season, riparian and wetland habitats provide important refuge for many species of neo-tropical migrating birds. Wetland,

riparian, and cropland habitat types are used for over wintering habitat for migratory waterfowl. Oak woodland and riparian habitats provide summer nesting habitat for bird species that winter elsewhere.

Several special status plant and wildlife species are known in the area; these include species that are listed under the state and federal ESAs as well as species that are designated for protection by State agencies and conservation organizations. Some of the plant and wildlife species that are most likely to be directly affected by this proposed Project include the Northern California black walnut, Sanford's arrowhead, the giant garter snake, bank swallow, Swainson's hawk, and valley elderberry longhorn beetle. Other species that may be indirectly affected by operation or induced growth include the vernal pool tadpole and fairy shrimp.

Previous investigations of the proposed Project area have identified habitat conditions along the American and Sacramento Rivers, identified regional general wildlife use patterns, and described the general range and distribution of special status species within the proposed Project area. Previous investigations also provide a framework for the evaluation of proposed Project operations on riparian vegetation.

The focus of the impact analysis for vegetation and wildlife will be the collection of site-specific data, by literature review or site investigation, on habitats and wildlife use and occurrence of special status species that may be affected by the proposed construction and operations of diversion facilities. This data will then be evaluated using methods and criteria consistent with those used in the ARWRI EIS and Water Forum Plan EIR. Particularly, the thresholds for determining significance levels of impact would be consistent to those used in the previous program-level analyses to maintain the consistency. The elements of investigation include:

- Conduct surveys and site-specific studies in accordance with recommended methodologies for listed threatened or endangered species or their potential habitat as needed, and determining the potential impacts of the proposed Project on threatened and endangered species, including any project induced agricultural or urban development.

- Document the effects of water levels in the Delta and potential responses to wetland and riparian vegetation and associated wildlife.

- Analyze the potential to directly remove or disturb riparian and other sensitive habitats along the American, Feather, and Sacramento rivers, and generally elsewhere in the study area from the construction of diversion, treatment, conveyance, storage, and other facilities necessary to implement the proposed Project.

Land Use

The analyses of the Water Forum Agreement and the ARWRI were based on the premise that water supply solutions be designed to serve population growth already accounted and planned for in adopted General Plans of the local jurisdictions by the year 2030. A population of 2,461,500 for Sacramento and Placer counties was assumed. This amounts to a 122% population increase from 1990.

The primary focus of the land use evaluation will be on the verification of the 2030 population assumptions and the planned distribution of growth and land use mix in the two counties in comparison to actual development rates and patterns that have occurred between 1990 and 2000. n addition, General Plan updates will be reviewed for consistency with earlier population estimates for the Project. This will provide the data necessary to evaluate the growth inducing impacts of the proposed Project based on validated growth rates, types of growth (land use mix) and geographic

concentrations. Both the demand assumptions for the Project and the growth inducement impacts evaluation of the Project would be affected if actual development trends have not been consistent with General Plan assumptions. However, note that the City of Sacramento, Roseville and Northridge intended to use the diversion to serve the areas where the General Plans have been approved.

The secondary focus will be on identifying all the cumulative impacts of the proposed Project components, other infrastructure and services projects, and planned but yet unapproved developments in the proposed Project study area.

In addition, local land use impacts of facilities based on the preliminary design will be evaluated. This will include the location of diversion structures, treatment plants, and pipeline alignments.

Key components of this evaluation will include:

- Land use impacts in the vicinity of diversion facilities, treatment plants, and along the pipeline alignment corridors.
- Consistency of General Plan growth assumptions with recent trends and projections.
- Consistency of General Plan land use mix assumptions with recent development trends and projections.
- Cumulative impacts resulting from currently planned but yet unapproved developments in the study area.
- Cumulative impacts of all proposed Project components involving Reclamation facilities or operations on land use conversions for agricultural or urban and industrial uses outside of adopted General Plans.

Recreation

Water levels and water level fluctuations have substantial influences on activities in all categories of recreation discussed in Chapter 2, particularly on the availability and quality of recreation opportunities in Folsom Lake. Project-specific analyses will be conducted to evaluate the comparative effects of proposed Project alternatives on recreation opportunities as follows:

- Effects of proposed flow regimes on availability and quality of water-related recreation opportunities in the lower American River, Feather River, and Sacramento River.
- The relationship of seasonal timing and magnitude of recommended instream flows in the American and Sacramento rivers, and other affected rivers with seasonal recreational use, such as whitewater rafting, swimming, water skiing, and boating.
- Effects of water level fluctuations on recreation activities at Folsom Lake, Lake Natoma, upper Sacramento River reservoirs, and the Delta.
- Consistency of resulting recreational effects with adopted recreation plans such as the American River Parkway Plan, the Lower American River's "Recreational River" Designations–State Wild and Scenic Rivers Act, the Lower American River "Recreational River"–National Wild and Scenic Rivers Act, and the Land Resource Management Plan for the Shasta-Trinity National Forest.

Cultural Resources

Although cultural resources impacts were covered in the Water Forum Plan EIR and the ARWRI EIS, these investigations should be expanded to cover specific locations of proposed Project facilities and preliminary design footprints. The following tasks should be undertaken:

- Identify an Area of Potential Effect (APE) for the Project, to be determined in consultation with the State Historic Preservation Officer (SHPO).

- Conduct an archaeological record search with the pertinent California Historic Resources Inventory System (CHRIS) information centers. Conduct inventory and evaluation of the APE to identify historical or archaeological properties that are or may be eligible for inclusion on the National Register of Historic Places. This should be carried out in consultation with the State Historic Preservation Officer (SHPO).

- Consult with the California Native American Heritage Commission (NAHC), in order to identify sacred sites listed in the NAHC database, and to identify appropriate Native American groups and individuals that should be consulted for further information. Review pertinent ethnographic literature and consult with Native Americans to produce an inventory and evaluation of ethnographic sites potentially affected by the proposed Project.

- Identify the potential to adversely affect cultural resources located within the APE, as a result of construction of diversion, treatment, conveyance, storage, and other water facilities necessary to implement the proposed Project.

- Consult with the SHPO and the Advisory Council on Historic Preservation regarding any potentially adverse effects on significant historic properties, and develop appropriate mitigation measures.

Environmental Protection and Mitigation Measures

The EIS/EIR will identify the necessary measures to mitigate adverse impacts identified through environmental review, and assess the potential effects of the mitigation measures.

- **Impacts related to construction and operation of facilities** – The possible mitigation measures include project alteration, limited construction schedule, alternate construction methods, and alternate operation. The direct loss of habitat would be mitigated for by project alteration, onsite restoration, or off-site habitat compensation.

- **Diversion-related impacts** – The impacts could be mitigated for by altered project operations, habitat preservation, or habitat enhancement projects.

- **Indirect, growth-induced impacts –** These impacts would be mitigated mainly through preparation and implementation of local habitat management plans, for which PL 106-554 provides grants. A detailed discussion is provided in the following section.

The intention of the proposed mitigation measures is to reduce the Project impacts to a less-than-significant level. In cases where unavoidable adverse impacts occur, the EIS/EIR will document the reasons.

Habitat Management Planning

Mitigation for Indirect, Growth-Induced Impacts

The indirect impacts related to population growth supported by the water deliveries through the proposed Project would be identified in the EIS/EIR through the evaluation process discussed previously. These include the impacts of new housing and infrastructure construction, increased demand for public services and utilities, and increases in traffic/circulation, noise and air emissions.

The EIS/EIR will evaluate the existing General Plans and General Plan EIRs in addressing the non-biological impacts. The indirect biological impacts of the project would be mitigated through the implementation of HCPs that are currently being developed for portions of Placer, Sacramento, and Sutter counties, and through equivalent planning processes in areas where HCPs are not now being developed.

The Placer and Sutter County HCPs are in the beginning stages of development and are estimated to be two years from completion. The Natomas Basin HCP has been revised and was available for comments in September 2001. This is a program for preservation and protection of habitat for threatened and endangered species found in northern Sacramento County and southern Sutter County. The plan encompasses 53,341 acres (16,582 acres within Sutter County and 36,759 within Sacramento County). The primary objective of this HCP is to promote conservation along with economic development and continuation of agriculture. Specific conservation plans include the protection of the Giant Garter Snake and the Swainson's hawk.

For the Giant Garter Snake, conservation objectives require a reserve system with one continuous habitat reserve 2,500 acres in size or larger with the remainder of the reserve system consisting of habitat blocks (a minimum of 400 acres each). These habitat blocks should include seasonal and permanent marsh and upland habitats, and include features that will allow for escape cover and protection during winter floods.

Conservation goals for the Swainson's hawk include retention and creation of sufficient quality nesting and foraging habitat with opportunity for population increases to meet any future recovery goals. The establishment of a tree-planting program for future nesting trees would also be implemented. Measures to reduce incidental take include nest site protection, nest site avoidance, pre-construction surveys, and annual surveys.

The Natomas Basin HCP also includes other species that may share in the same habitat as the Giant Garter Snake and the Swainson's hawk such as the tricolored blackbird, Aleutian Canada goose, white-faced ibis, American peregrine falcon, loggerhead shrike, bank swallow, greater sandhill crane, burrowing owl, northwestern pond turtle, California tiger salamander, western spadefoot toad, valley elderberry long-horned beetle and all vernal pool species. Although incidental loss of some species is inevitable with urban development, the Natomas Basin HCP provides a program to mitigate loss of wildlife species through protection, creation and expansion of upland and wetland habitats.

Habitat management planning will be used to assess HCP development within the service areas for development of programmatic habitat protection measures with the implementing agencies. This assessment would be coordinated with the development of the EIR/EIS and based on participation in HCP planning efforts, as well as, a review of other programs, as needed. The mitigation measures contained in the EIS/EIR would be developed in consultation with the affected land managing agencies, counties and cities. Measures within the EIR/EIS would be consistent with the specific measures either adopted by, or under consideration by, these entities within an HCP framework.

Grants to Support Local Habitat Management Planning Efforts

PL 106-554 authorizes grants to support local habitat management planning efforts that are related to the proposed Project. The grants will be administered by Reclamation. Depending on the nature of proposed habitat management planning efforts, the approval of grant allocation may be a federal action that requires a NEPA process. Therefore, the possible efforts for which the grants may be used include:

- The development of local HCPs in the service areas of the proposed Project – This action does not require a NEPA process.

- The implementation of local HCPs in the service areas of the proposed Project – This action requires a NEPA process. However, the grant would not be used for construction or purchase of land, resources, equipment or facilities.

- The NEPA process for possible implementation of local HCPs in the service areas of the proposed Project – This action does not require a NEPA process.

Biological Assessment

The objective of the Biological Assessment (BA) is to provide the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (CDFG) with information on potential biological impacts to threatened, endangered, and special-status species. This information will assist the agencies in carrying out their responsibilities under the ESA to develop Biological Opinions (BOs) for the proposed actions.

The BA will be based upon the analyses conducted for, and contained within, the EIS/EIR. It will include:

- The results of an on-site inspection of the affected area
- The views of recognized experts in the field
- A review of literature and other information
- An analysis of the effects of the action on species and habitat, including consideration of cumulative effects, and the results of any related studies
- An analysis of alternatives to the proposed actions

The BA will be developed in consultation with USFWS, NMFS, and CDFG, and will be coordinated with the HCPs currently being developed within the affected areas.

Other Federal and State Actions

Federal Review and Approvals

Prior to project approval, Reclamation would be required to comply with ESA and NHPA. Compliance with these laws will require Reclamation studies and consultations throughout the project with NMFS and USFWS for ESA compliance and SHPO for NHPA compliance. Other federal agencies providing funding or approvals for this program are compelled to make findings under these laws [e.g. U.S. Army Corps of Engineers (Corps)]. Reclamation may consider early consultations with these federal partners as well. The following is a brief description of consultations for required compliance under the NHPA and ESA, followed by a description of the Corps approvals under Section 404.

Consultation with the State Historic Preservation Officer

Successful completion of the review process with the SHPO under Section 106 of NHPA for the proposed Project would be based on regular consultations throughout the study. Early consultations with the SHPO would be used to determine the area of potential effect (APE); completeness of the inventory; and survey requirements for historic, pre-historic, and ethnographic resources within the study area. If surveys are required for the APE and sites are identified, site records would be completed for the SHPO review. Follow-up consultations on appropriate protection measures would be conducted with the SHPO for sites that could be affected by the proposed action. If the proposed action would disturb a site that has been or could be listed on National Register of Historic Places, additional consultations would be implement to determine appropriate course of action for site evaluation, testing, or further documentation or analysis procedures. Consultation with the SHPO at these key points in the study program will help to achieve concurrence from the SHPO on Section 106.

Consultation on Endangered Species

Federal agencies are restricted from issuing approval or providing funding for a project that may affect species that are proposed for listing or have been listed under the ESA. This law directs NMFS to review projects for potential effects on anadromous fish; and USFWS to review project for potential effects on other listed species, including resident fish. Following project review, these agencies issue a BO to the federal agency to incorporate into project analysis and approval.

For the proposed Project, NMFS would likely consider potential alteration of the aquatic habitat due to the proposed Project for adverse effects on listed steelhead and runs of Chinook salmon. Within the general proposed Project region there are two species that may be directly affected and require consultation with the USFWS; these are the Valley elderberry longhorn beetle and giant garter snake. Other species that may require consultation with the USFWS for indirect effects include the Sacramento splittail, Delta smelt, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

Prior to formal consultation under Section 7 of the ESA, project review should be conducted under informal consultation. Both formal and informal consultations provide the foundation for successful completion of the ESA process in framing the issues and by delivering the best available scientific and commercial information for analysis and review in the project context. Key milestones in the consultation process would be acceptance of:

- Project description and related biological environment
- Potential impacts and data needs to address impacts
- Thresholds for impact analysis
- Study plans (e.g., field methods, scope, timing, etc)
- Field results and analysis
- Conclusions and findings for effect on listed species

The BA is the cornerstone of the ESA consultation process, providing a basis for the agencies' BO. The content requirements for a BA are at the discretion of federal agencies. Suggested information for a BA is described under 50CDF402.12(f). The suggested contents include:

- The results of an on-site inspection of the affected area
- The views of recognized experts in the field
- A review of literature and other information
- An analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies

- An analysis of alternative actions considered by the federal agency of the proposed action

Preparation of Fish and Wildlife Coordination Act Report

The Fish and Wildlife Coordination Act requires Reclamation to consult with the USFWS, NMFS, and CDFG on the impacts of the proposed Project on any stream, river or other body of water. These agencies would prepare a "Fish and Wildlife Coordination Act Report" using the material supplied by Reclamation from the EIS/EIR. The Fish and Wildlife Coordination Act Report has a broader responsibility than the ESA, and includes evaluations of impacts on wetlands and plant and animal species that are not listed for protection. This consultation is carried out in parallel with the ESA consultation, which involves the preparation of a BA.

Section 404 Consistency

Implementation of the proposed Project would require a permit issued by the Corps under Section 404 of the Clean Water Act for any activity that places fill within the waters of the United States. The review would be conducted by the Corps' Sacramento District and include four components: 1) NEPA compliance; 2) NHPA Section 106 compliance; 3) ESA compliance; and 4) Section 404(b)(1) alternatives analysis.

The purpose of the Section 404(b)(1) alternative analysis is to demonstrates that the proposed Project is the least damaging alteration on wetlands and Waters of the United States. The alternative analysis shall include 1) a description of the potential direct, indirect, and cumulative effects on the physical, chemical, and biological and human use characteristics of the potentially affected aquatic ecosystem; and 2) a description of measures that could be undertaken to avoid or reduce these effects. Alternatives development for the proposed Project will focus on alternative diversion sites, alternative construction methods, and alternative operational criteria that may affect wetlands and Waters of the United States.

State Review and Approvals

Several State agencies would be involved in the review and approval process for the proposed Project. These include:

- **SWRCB**. This agency has an interest in issues involving water rights and the points of diversion. In conjunction with the RWQCB, the SWRCB would also be involved in assuring compliance with the Clean Water Act by issuing a Section 401 Water Quality Certification or Waiver, and in water quality protection by issuing a Storm Water Construction Permit.

- **CDFG**. This agency would work with the federal agencies in assuring ESA compliance, and would also issue a Streambed Alteration Agreement under Section 1600 of the California Fish and Game Code. CDFG would also carry out project review and approval for State-listed species including Swainson's hawk, bank swallow, giant garter snake, winter-run Chinook salmon, spring-run Chinook salmon, Delta smelt, and Sacramento splittail.

- **State Lands Commission**. This agency would be involved in issuing leases for the use of submerged lands within the Sacramento, Feather, or American rivers. This agency may utilize the EIS/EIR to ensure compliance with CEQA in issuing the leases.

PUBLIC INVOLVEMENT PROGRAM

Public involvement is the systematic provision for the affected public to be informed about and participate in Reclamation's decision-making process. The NEPA/CEQA process also requires public involvement. Public involvement centers on effective, open exchange and communication among the partners, agencies, organizations, and all the various affected publics. During the Feasibility Study, Reclamation and local project sponsors would identify the affected individuals, groups, and communities and systematically provide opportunities for these affected publics to be informed about the issues, participate in the definition of the problem, objectives, and possible solutions, and have their views documented and considered in Reclamation's decision-making process.

Public Involvement Program Plan

A Public Involvement Program Plan (Plan) has been developed for the Study. This Plan, provided in Appendix B, describes a multidimensional, multimedia communication protocol to enhance public involvement in the Study. The Plan would be regularly reviewed and updated during the course of the Study to improve its effectiveness and efficiency.

Scoping Report

The purpose of a scoping report is to document the efforts and results of the public scoping process for the Study. The content of the scoping report will include:

- Documentation of the scoping process and other public involvement activities during the early planning stage.
- The comments received by Reclamation and local sponsors during the scoping meetings and prior to the comment period.
- A summary of the issues raised and the selected responses.
- Descriptions of recommended issues and alternatives that would be carried forward in the EIS/EIR.

OTHER STUDY DOCUMENTATION

Other documentation that will be prepared during the Study include:

- **Preliminary Findings Report.** This report will be prepared at the end of the first year in the study period. The contents of the report will be a summary of Study progress, major accomplishments and findings, necessary modifications in direction and strategy of Study components based on the findings, and tentative schedule for the remainder of the Study.
- **Miscellaneous Technical Memoranda.** Technical memoranda should be prepared as intermediate Study products and as an official communication tool amongst Study team members. These technical memoranda would provide major support in the decision process.

STUDY MANAGEMENT

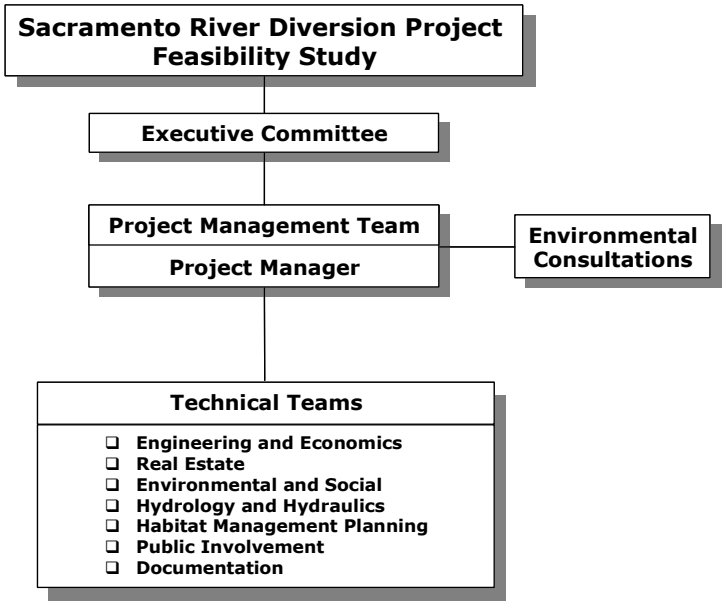
The organization chart in Figure 3-1 illustrates the project management structure for completing the Study. Table 3-1 shows the task allocations among the identified teams. The principal elements of the management structure for completing the Study include:

- **Executive Committee**. This group would be comprised of the policy-making representatives from Reclamation and local sponsors including PCWA and the City of Sacramento. The committee would be in close collaboration with the Project Manager, providing overall guidance and policy, study cost control, dispute resolution and the final approval of the Study reports.

- **Project Management Team**. This group would be comprised of Reclamation's Project Manager and representatives from major project beneficiaries including PCWA, the City of Sacramento, Roseville, and Northridge. Natomas would be invited into the Project Management Team to provide consultation regarding the progress and direction of their diversion consolidation project. The team, led by the Project Manager, would supervise and coordinate the efforts of Technical Teams, and also facilitate the necessary environmental consultations with respective resource agencies and provide direction to the consultants' project manager.

- **Technical Teams**. These include seven individual teams with distinct study foci. These Teams would be primarily staffed by consultants and operate under the Project Management Team for progress control and overall consistency with agency missions and direction for technical area. Technical representatives from the local sponsors and Reclamation would participate on the teams.

Figure 3-1. Organization Chart for Feasibility Study Management



STUDY SCHEDULE

Figure 3-2 shows the Study schedule and major milestones. It is anticipated that the Study would take at least 24 months to complete. However, there are uncertainties associated with the amount of time required for resource agencies to issue the BOs for the proposed actions. A minimum of three months is included in the current schedule.

Sacramento River Diversion Project